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(54) TRANSMITTER AND RECEIVER DEVICE WITH LATCHING MECHANISM FOR CONNECTING A BATTERY

(71) We, REPCO INCORPORATED, a Corporation organised and existing under the Laws of the State of Delaware, United States of America, of 1940 Lockwood Way, P.O. Box 7065, Orlando, State of Florida, United States of America, do hereby declare the invention, for which we pray that a Patent may be granted to us, and the method by which it is to be performed, to be described in and by the following Statement:—

This application relates generally to transmitter-receivers and more specifically to latching mechanisms for providing a quick release of the battery housing for such transmitter-receivers.

Transmitter-receiver devices are well-known and in wide spread use today both in commercial and private use. Those generally in private use have non-rechargeable batteries therein and are not provided with a battery designed for quick replacement so that the device may be used constantly over a twenty-four hour period.

On the other hand, commercial transmitter-receiver devices are built with a much more rugged construction and more precise channel selection because of the extremely rough and continuous use to which they are subjected. Additionally, the only practical means for providing energy to these commercial devices is to use rechargeable battery elements. The reason for this is that the individual transmitter-receivers are relatively expensive and it is desirable to obtain the maximum usage with each unit. Therefore, if the company using a large number of units also has a compatible battery recharger, fresh batteries are available at all times when needed. Normally, the transmitter-receiver and associated rechargeable battery will operate for approximately an eight hour period which matches the normal work

shift for the personnel using the device. At a change of shift, the oncoming worker merely removes the rechargeable battery, places it in the battery charger and removes a fully charged battery from the battery charger for use with the transmitter-receiver.

The above is standard procedure in large operations today. Most of the transmitter-receivers in use today have a battery contained in a housing which mates with the housing of the transmitter-receiver and is secured thereto by means such as a screw or the like. Securing devices such as screws require either a tool such as a screw-driver or at the very least a coin. Often times the battery is so tightly secured that a coin will not operate satisfactorily. Additionally, a certain amount of time is wasted by not being able to quickly remove and replace the battery. Further, the lack of convenience may often result in the oncoming shift avoiding a battery change with the resultant failure of the radio at a inopportune time.

Accordingly, it is an object of the present invention to provide a transmitter-receiver with an easily removable battery housing.

A further object of the invention is to provide a removable battery housing for a transmitter-receiver unit which is unlatched by merely pressing a spring loaded button and rotating the battery casing whereby it drops away from the unit.

According to the present invention a transmitter and receiver unit comprises a housing for the transmitter-receiver, a housing for a battery, connecting means for connecting said housing together, terminal means at one end of said battery housing and contact means at one end of said transmitter-receiver housing for mating with said terminal means when said housing are connected, wherein said connecting means comprise:

rigid finger means extending below said transmitter-receiver housing on one side thereof,

5 a spring biased button means substantially opposite said finger means on said transmitter-receiver housing,

grooved means within said one end of said battery housing for receiving said rigid finger means and

10 camming means extending outwardly from said one end of said battery housing for moving and mating with said button means.

An embodiment in accordance with the invention is hereinafter particularly described with reference to the accompanying drawings, wherein:

Fig. 1 is a perspective view of one type of transmitter-receiver of the present invention;

Fig. 2 is a bottom view of the transmitter-receiver housing with the battery removed;

Fig. 3 is a sectional view taken through the lines 3-3 of Fig. 2;

Fig. 4 is a plan view of the top of the battery housing;

Fig. 5 is a partial sectional view of one upper end of the battery housing; and

30 Fig. 6 is an exploded view illustrating the relative position for attachment and removal of the battery housing from the transmitter-receiver housing.

There is shown in Fig. 1 a transmitter-receiver housing 11 having an on-off switch knob 13 and squelch knob 15. The standard transmitter-receiver also includes a channel selector switch 17, an antenna 19, a speaker 21 and a push-to-talk switch 23.

40 A rechargeable battery housing 25 is secured to the transmitter-receiver housing by means which will be described in connection with Figs. 2-6.

Fig. 2 illustrates the lower end or bottom of the transmitter-receiver housing 11 which includes electrical contacts 27 for mating with the terminals 59 on the battery housing.

Extending downwardly from one side of the transmitter-receiver housing 11 is a rigid finger member 29 having rods 31 and 33 extending outwardly from either side thereof.

At the opposite side of the lower end of the transmitter-receiver housing 11 there is a flange 35 extending downwardly from the said housing. This flange forms an integral L-shaped member having one leg extending along the inner face of the lower part of the said housing. This leg includes two outer sections 37 and 39 which form channels such as shown at 47 in Fig. 6.

A rigid L-shaped button 45 has a slot 41 which passes over the post 43 extending upwardly from the leg 35.

Button 45 may be provided with a serrated face 49 so as to prevent slippage when the button is being depressed to release the battery housing from the transmitter-receiver housing.

A spring member 51 is located across and within the channels 47 so as to bias the button member 45 outwardly.

The L-shaped button member also has channels 53 and 55 extending along one face thereof with the channels terminating in an inclined surface 57 as shown more clearly in Fig. 3.

Turning now to Figs. 4 and 5, it will be seen that the battery housing is provided with a notch 61 which is of a dimension to accept the rigid finger 29 of the transmitter-receiver housing.

Extending outwardly from the notch and within the faces of the notch 61 are grooves 63 and 65 which are of a dimension to accept the posts 31 and 33 extending outwardly from the rigid finger 29.

Opposite notch 61 on the other side of the battery housing 25 is located a cut-away section 67 which accepts the rigid flange 35. Extending upwardly from the cut-away section 67 are dual posts 69 and 71 which terminate in curved ends having camming edges 73.

It will be seen that when it is desired to connect the battery housing to the transmitter-receiver housing it is tilted at an angle thereto, as shown in Fig. 6, whereby the rigid finger 29 passes into the notch 61 and the posts 31 and 33 are nested within the grooves 63 and 65.

The battery housing 25 is then rotated so as to come into contact with the transmitter-receiver housing 11 whereby the camming edges 73 of the posts 69 and 71 bear against the inclined surface 57 of the channels 53 and 55 so as to bias the button member 45 against the spring bias and allow the upper part of the posts to pass beyond the inclined face 57. As these posts pass beyond the inclined face, the spring bias again moves the button outwardly and the battery is firmly locked in place by the action between the button member and the posts 69 and 71.

When the battery is to be removed from the transmitter-receiver housing, it is merely necessary to depress the button 45 by means of the serrated face 49 so as to overcome the bias spring and release the post members 69 and 71 from retention by the button member. The battery housing is then rotated approximately 45° whereby the rods 31 and 33 may be slipped outwardly from the grooves 63 and 65.

It will be seen that there has been provided by this invention a quick and easily operable release mechanism for a battery which is used with a transmitter-

receiver device. Accordingly, batteries may be changed quickly and with no extra equipment whatsoever.

5 WHAT WE CLAIM IS:—

1. A transmitter and receiver device with a connector for securing a rechargeable battery to said transmitter-receiver comprising:
 - 10 a housing for said transmitter-receiver; a rigid finger extending from the lower end of said housing at one side thereof; respective rods extending outwardly from either side of said finger;
 - 15 a spring biased L-shaped button member secured to the lower end of said housing at the other side thereof, one leg of said button member extending inwardly along the lower end of said housing;
 - 20 channels in said one leg of said button member; a housing for said rechargeable battery, said housing for said battery having a dimension at its upper end substantially
 - 25 the same as the dimension of the lower end of said transmitter-receiver housing; a notch in the upper end of said battery housing at one side thereof for receiving said rigid finger;
 - 30 grooves in said battery housing adjacent said notch for receiving said rods; posts extending outwardly from the upper end of said battery housing having curved upper ends for mating with said
 - 35 channels in said button member, said posts moving said button member to overcome said spring bias and passing into a locking position with said one leg of said button member;
 - 40 electrical terminals on the upper end of said battery housing, and contact members on said transmitter-receiver housing for mating with said terminals when said housings are connected.
 - 45 2. A transmitter and receiver unit comprising a housing for the transmitter-receiver, a housing for a battery, connecting means for connecting said housings together, terminal means at one end of said
 - 50 battery housing, and contact means at one end of said transmitter-receiver housing for mating with said terminal means when said housings are connected, wherein said connecting means comprise—

rigid finger means extending below said 55 transmitter-receiver housing on one side thereof,

a spring biased button means substantially opposite said finger means on 60 said transmitter-receiver housing,

grooved means within said one end of said battery housing for receiving said rigid 65 finger means and

camming means extending outwardly from said one end of said battery housing 70 for moving and mating with said button means.

3. A transmitter and receiver unit as claimed in claim 2, wherein said rigid 75 finger means comprises—

a finger, and

respective rods extending from either 80 side of said finger.

4. A transmitter and receiver unit as claimed in claim 3, wherein said grooved 85 means comprises—

a groove having a dimension sufficient to accept said finger, and

slots extending outwardly from said 90 groove for accepting said rods.

5. A transmitter and receiver unit as claimed in claims 2, 3 or 4, wherein said 85 button means comprises—

a rigid L-shaped member having one leg of said member lying adjacent the face of 90 one end of said transmitter-receiver housing, and

channels in said one leg for accepting 85 said camming means.

6. A transmitter and receiver unit as 90 claimed in claim 5, wherein said camming means comprises—

posts having curved upper ends with camming surfaces for mating with said 95 channels, said posts moving said L-shaped member to overcome said spring bias and passing into a locking position with said one leg of said L-shaped member.

7. A transmitter and receiver unit substantially as described herein with reference 100 to the accompanying drawings.

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